

CLAIMS

I claim:

1. A method for utilizing a corner cube in a polarization transformer, comprising.
 - (a) an input polarized light beam irradiating said corner cube; and
 - (b) a polarization transformed output beam retroreflecting from said corner cube.
2. The method of claim 1, wherein:
 - (a) said input light beam is a probe beam irradiating one facet of said corner cube whereby said probe beam is off-set from the vertex of said corner cube for the standard polarization transformer;further including:
 - (b) a rotation means for adjusting the relative angle ψ between the reference axis of said corner cube and the polarization orientation vector of said probe beam by rotating the input polarization rotator or by rotating said corner cube; and
 - (c) a rotation means for adjusting polarization orientation angle of said output beam from said corner cube by rotating the output polarization rotator.
3. The method of claim 2, further including:
 - (a) a diagnostics processor module integrated in combination with the corner-cube module;
 - (b) a polarization insensitive beam splitter providing a small fraction of said output beam as a sample signal to said diagnostics processor module whereby said signal is processed to establish the required rotation angles for said rotators and thereby attain a specified polarization state for said output beam; and
 - (c) a computer directing polarization state specifications into said diagnostics processor module;wherein:
 - (d) said diagnostics processor module provides drive voltages for said rotators;
 - (e) said corner cube is fabricated from a glass having substantially a refractive index centered about $n_0=1.76748$;
 - (f) said input beam is substantially at normal incident to said corner cube; and
 - (g) said output beam is retroreflected by total internal reflection from the corner cube facets.
4. The method of claim 1, wherein:

- (a) said polarization transformer is a depolarizer providing a depolarized output beam for said transformed output beam;
 - (b) said input light beam is a circularly-polarized beam irradiating symmetrically on axis to the vertex of the corner cube facets; and
 - (c) a polarization insensitive bi-directional beam director steers said depolarized output beam away from the path of said circularly polarized input beam.
5. The method of claim 4, further including:
- (a) a beam homogenizer scrambling a spatial hexad pattern of said depolarized output beam; and
 - (b) a dielectric layer pattern of alternate hexads deposited on the output port of said beam director in spatial registry to the beam pattern of said output beam whereby beamlets of said output beam are equalized in phase thereby resulting in temporal coherence of said depolarized output beam;
- wherein:
- (c) said corner cube is fabricated from a glass having substantially a refractive index centered about $n_0=1.76748$;
 - (d) said input beam is substantially at normal incident to said corner cube; and
 - (e) said output beam is retroreflected by total internal reflection from said corner cube facets.
6. A standard polarization transformer, comprising:
- (a) a corner cube;
 - (b) an input polarized light beam irradiating said corner cube; and
 - (c) a polarization transformed output beam from said corner cube.
7. The transformer of claim 6, wherein said output beam is focused to a small spot of proper numerical aperture and is launched into an optical fiber.
8. The transformer of claim 6, wherein air-beam paths between optical components are replaced with fiber optical links.
9. The transformer of claim 6, wherein:
- (a) said input light beam is a probe beam irradiating one facet of said corner cube whereby said probe beam is off-set from the vertex of said corner cube;
- further including:

- (b) a rotation means for adjusting relative angle ψ between the reference axis of said corner cube and the polarization orientation vector of said probe beam by rotating the input polarization rotator or by rotating said corner cube; and
 - (c) a rotation means for adjusting polarization orientation angle of said output beam from said corner cube by rotating the output polarization rotator.
10. The transformer of claim 9, further including:
- (a) a diagnostics processor module integrated in combination with the corner-cube module for said transformer;
 - (b) a polarization insensitive beam splitter providing a small fraction of said output beam as a sample signal to said diagnostics processor module whereby said signal is processed to establish the required rotation angles for said rotators and thereby attain a specified polarization state for said output beam; and
 - (c) a computer directing polarization state specifications into said diagnostics processor module;
- wherein:
- (d) said diagnostics processor module provides drive voltages for said rotators;
 - (e) said corner cube is fabricated from a glass having substantially a refractive index centered about $n_0=1.76748$;
 - (f) said input beam is substantially at normal incident to said corner cube; and
 - (g) said output beam is retroreflected by total internal reflection from the corner cube facets.
11. The transformer of claim 10, wherein air-beam paths between optical components are replaced with fiber optical links.
12. A depolarizer, comprising:
- (a) a corner cube;
 - (b) an input polarized light beam irradiating said corner cube; and
 - (c) a depolarized output beam from said corner cube.
13. The depolarizer of claim 12, further including:
- (a) a laser module containing an isolator and a quarter-waveplate and a beam expander collimator lens integrated in combination with said corner-cube module for the depolarizer unit;

wherein:

- (b) a linearly polarized laser beam incident to said quarter-waveplate whose axes are at 45° with respect to the polarization plane of said laser beam generates a collimated circularly polarized beam for said input polarized input beam.
14. The depolarizer of claim 12, wherein said depolarized output beam is focused to a small spot of proper numerical aperture and is launched into an optical fiber.
 15. The depolarizer of claim 12, wherein air-beam paths between optical components are replaced with fiber optical links.
 16. The depolarizer of claim 12, wherein:
 - (a) said input light beam is circularly-polarized irradiating symmetrically on axis to the vertex of the corner cube facets;
further including:
 - (b) a polarization insensitive bi-directional beam director steers said depolarized output beam away from the path of said circularly polarized input beam.
 17. The depolarizer of claim 16, further including;
 - (a) a beam homogenizer scrambling a spatial hexad pattern of the steered depolarized output beam; and
 - (b) a dielectric layer pattern of alternate hexads deposited on the output port of said beam director in spatial registry to the beam pattern of said output beam whereby beamlets of said output beam are equalized in phase thereby resulting in temporal coherence of said depolarized output beam;
 wherein:
 - (c) said corner cube is fabricated from a glass having substantially a refractive index centered about $n_0=1.76748$;
 - (d) said input beam is substantially at normal incident to said corner cube; and
 - (e) said output beam is retroreflected by total internal reflection from said corner cube facets.
 18. The depolarizer of claim 17, wherein said depolarized output beam is a collimated air beam.
 19. The depolarizer of claim 17, wherein the collimated depolarized output beam focused to a small spot and proper numerical aperture is launched into an optical fiber.
 20. The depolarizer of claim 19, wherein air-beam paths between optical components are replaced with fiber optical links.